CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A plasma arc cutting torch comprising:

a cutting torch body defining an axial bore;

a cathode supported within said axial bore;

a lead attachable to a workpiece in electrical communication with said cathode; and

a nozzle removably supported on said cutting torch body and including an orifice in fluid communication with said axial bore, said nozzle including a body fabricated of a first material, said nozzle further including a second material defining said orifice, said second material being electrically conductive, the melting temperature of said second material being higher than the melting temperature of said first material.

2. The plasma arc cutting torch of claim 1 wherein said second material includes tungsten or a tungsten alloy.

3. The plasma arc cutting torch of claim 2 wherein:

said nozzle includes an inner surface; and

said second material forms at least a portion of said inner surface.

4. The plasma arc cutting torch of claim 1 wherein said second material is an insert secured within said nozzle body.

5. An apparatus for focusing a transferred plasma arc for cutting or welding a workpiece comprising:

a lead attachable to the workpiece;

a plasma arc cutting torch;

a nozzle including a first end removably mounted on said torch and a second exit end; and

a heat resistant, electrically conductive material within said nozzle exit end and defining an exit orifice.

6. The apparatus of claim 5 wherein:

said second end includes an inner surface; and

said heat resistant, electrically conductive material is coated on said inner surface.

7. The apparatus of claim 6 wherein said heat resistant, electrically conductive material is an insert supported within said exit end.

8. The apparatus of claim 7 wherein said heat resistant, electrically conductive material is tungsten or a tungsten alloy.

9. A plasma arc cutting torch for creating a transferred plasma arc comprising:

a plasma arc cutting torch;

a nozzle body attachable to said torch, said nozzle body defining an axial bore extending about a central axis to an exit opening, at least a portion of said nozzle body including a layer of tungsten; and

a cathode coaxially disposed within said opening, said cathode transferring a plasma arc along said central axis through said opening to a workpiece, such that said cathode is in electrical connection with said workpiece.

10. The cutting torch of claim 9 wherein said plasma arc is transferred to said workpiece for cutting said workpiece.

11. The cutting torch of claim 9 wherein said plasma arc is transferred to said workpiece for welding said workpiece.

12. The cutting torch of claim 10 or claim 11 wherein said exit opening includes an inner surface, said inner surface including said layer of tungsten.

13. The cutting torch of claim 12 wherein said layer of tungsten extends throughout axial bore.

14. The cutting torch of claim 13 wherein all of said nozzle body is comprised of said layer of tungsten.

15. The cutting torch of claim 14 wherein said layer of tungsten is a thermal spray coating.

16. The cutting torch of claim 15 wherein said tungsten is attached as a separate piece.